# GARISSA UNIVERSITY

**UNIVERSITY EXAMINATION 2017/2018 ACADEMIC YEAR THREE SECOND SEMESTER EXAMINATION**

**SUPPLEMENTARY/SPECIAL EXAMINATION**

**SCHOOL OF BUSINESS AND ECONOMICS**

**FOR THE DEGREE OF BACHELOR OF BUSINESS MANAGEMENT**

**COURSE CODE: BBM 355**

**COURSE TITLE: OPERATIONS RESEARCH**

**EXAMINATION DURATION: 3 HOURS**

**DATE: 23/03/18** **TIME: 09.00-12.00 PM**

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## INSTRUCTION TO CANDIDATES

- **The examination has SIX (6) questions**
- **Question ONE (1) is COMPULSORY**
- **Choose any other THREE (3) questions from the remaining FIVE (5) questions**
- **Use sketch diagrams to illustrate your answer whenever necessary**
- **Do not carry mobile phones or any other written materials in examination room**
- **Do not write on this paper**

**This paper consists of FOUR (4) printed pages** ***please turn over***

**QUESTION ONE (COMPULSORY)**

(a) Briefly explain the following terms

i. Objective function **[ 2 marks]**

ii. Constraints **[2 marks]**

iii. Optimum solution **[2 marks]**

(b) The manager of a bank observes that on the average 18 customers are served by a cashier in a hour. Assuming that the service time has are experimental distribution, what is the probability that;

i. A customer shall be free within 3 minutes **[5 marks]**

ii. A customer shall be serviced in more than 12 minutes **[ 5 marks]**

(c) Outline and explain any methods for the measurement of investment worth. **[5 marks]**

(d) Briefly explain the number of possibilities when picking up from the waiting line for service **[4 marks]**

**QUESTION TWO**

(a) Two firms are competing for business. Whatever firm A gains, B firm loses. The table given below shows advertising strategies of both the firms and utilities to firm A for various market shares in percentages (assuming this to be a zero sum game):

Firm A's Utility

| | | Firm B | | |
|---|---|---|---|---|
| | | Press | Radio | T.V. |
| Firm A | Press | 60 | 75 | 40 |
| | Radio | 75 | 75 | 60 |
| | T.V. | 60 | 70 | 70 |

Find optimal strategies for both firms and expected percentage of market shares to firm A.

**[14 marks]**

(b) Determine the break-even sales in the following case:

| Product | | |
|---|---|---|
| A | B | C |

| | | | |
|---|---|---|---|
| Sale (Units) | 5000 | 6000 | 4000 |
| Unit selling price (Ksh.) | 10 | 15 | 18 |
| Unit variable cost (Ksh.) | 6 | 4 | 13 |
| Fixed cost (Ksh) 4000 | | | |

[**6 marks]**

**QUESTION THREE**

(a) Briefly explain the steps contained in solving a transportation problem **[6 marks]**

(b) Solve the following transportation problem. Obtain the initial solution by NW corner rule.

| | | TO | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Supply |
| From | A | 7 | 3 | 8 | 6 | 60 |
| | B | 4 | 2 | 5 | 10 | 100 |
| | C | 2 | 6 | 5 | 1 | 40 |
| Demand | | 20 | 50 | 50 | 80 | 200 |

**[14 marks]**

**QUESTION FOUR**

(a) Linear programming problem is based on specific assumptions. Highlight and explain these assumptions **[10 marks]**

(b) Solve graphically the following LPP

Maximize Z= 4x+5y

Subject to constraints

$2x+3y \leq 12$

$2x + y \leq 8$

And $x, y \geq 0$ **[10 marks]**

**QUESTION FIVE**

(a) Explain the elements of a decision problem **[6 marks]**

(b) A group of students raises money each year by selling souvenirs outside the stadium after a cricket match between Teams A and B. They can buy any of the three different types of souvenirs from a supplier. Their sales are mostly dependent on which team wins the match. A conditional pay off table is as under:

| Teams | Type of Souvenir | | |
|---|---|---|---|
| | I | II | III |
| Teams A Wins<br>Team B Wins | Ksh.1200<br>Ksh.250 | Ksh.800<br>Ksh.700 | Ksh.300<br>Ksh.1,100 |

i. Construct the opportunity loss table **[6 marks]**

ii. which type of souvenir should the students buy if the probability of team A's winning is 0.6 **[6 marks]**

iii. Find out the cost of uncertainty. **[2 marks]**

**QUESTION SIX**

(a) Outline and explain the general assumptions made to solve the sequencing problems **[10 marks]**

(b) Discuss the operating characteristics of queuing system **[10 marks]**